# Electronic Search Techniques

## Topics

Lesson 1 – Internet and the World Wide Web

Lesson 2 – Research Design

Lesson 3 – Basic Search Methodology

- Search Aids/Tools
- Search Process
- Topic Development Worksheet
- Constructing Your Search

Lesson 4 – Citing Your Sources

Lesson 5 – Searching, and Evaluating Search Results



## Objective

Demonstrate basic search methodologies and techniques necessary to conduct research on the Internet and other electronic search tools.

# Lesson 1

## Internet and the World Wide Web

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## What is the Internet?

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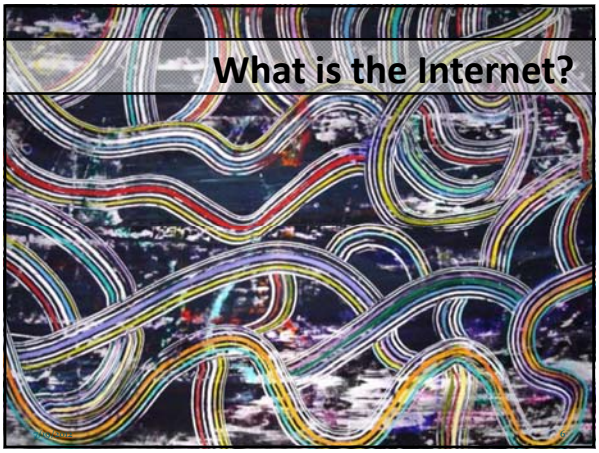
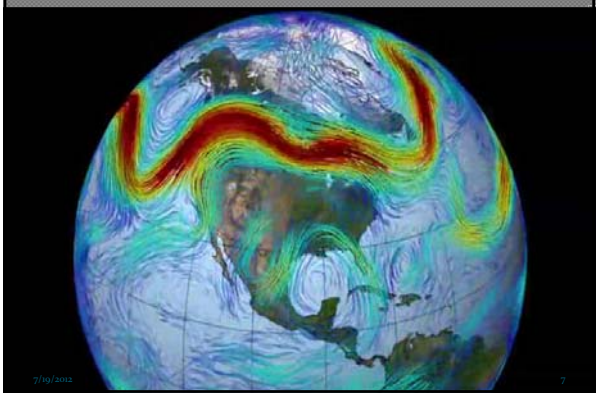
## What is the Internet?



## Internet and the World Wide Web



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## Internet and the World Wide Web

- Global system of interconnected computer networks that use the standard Internet Protocol Suite (TCP/IP) to serve the users worldwide
- Vast range of information resources and services
- Decentralized information
- Not organized

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## Internet and World Wide Web

- Dynamic
- Information is increasing
- Not reviewed or edited
- Not always authentic or accurate
- Not stable

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## Internet and the World Wide Web

Search tools and techniques are:

- numerous and varied
- not standardized
- constantly changing

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## World Wide Web

According to Wikipedia, the World Wide Web "is a system of interlinked hypertext documents accessed via the Internet. With a web browser, one can view web pages that may contain text, images, videos, and other multimedia and navigate between them via hyperlinks."

*Graphic representation of a minute fraction of the WWW, demonstrating hyperlinks*
*(source: Wikipedia)*

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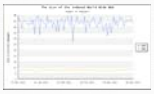
## World Wide Web

As of April 2, 2012, the Indexed Web contained at least 8.02 billion pages.



The current size of the Web is available at http://www.worldwidewebsize.com/.

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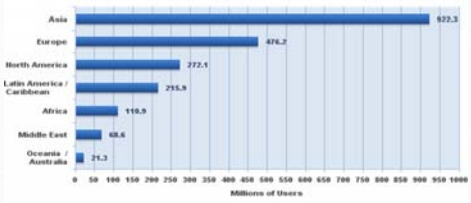
## Internet Users

As of December 31, 2011, there were 2,267,233,742 Internet users.

Internet Usage by World Region as March 31, 2011

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LESSON 1



## How do you conduct a search using the World Wide Web?



## You Need a Process

# Lesson 2

## Research Design or Research Methods

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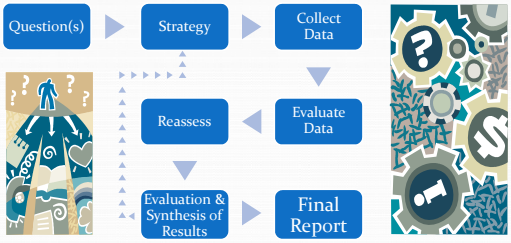
## Research Design

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## Information Process

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# Lesson 3

## Basic Search Methodology



## Information Needs Assessment

1. Who, what, when, where, why?
2. Date (timeframe), language, copyright, money, time, use of Internet?
3. What are the criteria and limits?
4. Types of resources, FOIA, final product, monitor or track?
5. Do you understand the question?
6. Do you need background information?
7. What is the deadline?
8. What is the format of the final product?

LESSON 3



## Strategy

Known required materials? Obtain ASAP

- Order or purchase materials
- Obtain translation(s)
- Borrow materials
- Prepare search strategies for databases and Internet searches

*"You can't always find everything, but you can always find something."*

LESSON 3

## Resources – Examples

- Reference materials
- Archived documents
- Out-of-print materials
- Interlibrary loan materials
- Materials that cannot be borrowed or materials that are too lengthy for a FOIA request
- Maps
- Statistics
- Journals/magazines
- Government documents and repositories
- Repositories
- Materials not published in an electronic format

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## Resources – Examples

- Web sites/portals
- Television
- Radio
- Audio
- Video
- Databases
- Digital images
- Blogs, weblogs, wikis, etc.
- DVD
- Email
- Chat rooms
- GIS
- Maps
- Social media
- CD-ROM

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## Documentation and Storage

- Bibliography?
- Personal notes; strategies
- Endnotes or footnotes?
- Results

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## Final Product/Deliverable

- Template
- Cover letter
- Footnotes/Endnotes?
- Analysis?
- Sources
  - Links?
  - Full-text? (copyright compliant)
  - Hard Copy?
- Translations?
- Bibliography?

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## Search Aids/Internet Tools and Resources

- Utilization of Internet Tools and Resources for Open Source Intelligence (OSINT)
  www.onstrat.com/osint
- Intelligence Indexes
  http://www.fuld.com/fuld-bin/f.wk?fuld.i3.home
- Portals
  Example: Ipl2
  www.ipl.org/div/subject
- Pathfinders/research guides
  Example: Boston University Libraries Instruction and Class Guides
  www.bu.edu/library/instruction/wr150guide.html
- University of California, Libraries, Research Tips and FAQs
  http://libguides.lib.uci.edu/content.php?pid=42073&sid=797721

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## Searching

A word about searching…

- Allow time for the planning of the search process and documentation
- Allow time for the actual search process and documentation
- Be objective
- Alternative perspectives and contrary reporting should be provided
- All available sources of information should be accessed
- Document your search journey

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## Search Process

1. **Preparation**
   Identify the concepts and search terms. Stop words.
2. **Select resource**
3. **Choose the type of search**
4. **Create strategy**
5. **Limit**
6. **Refine search**

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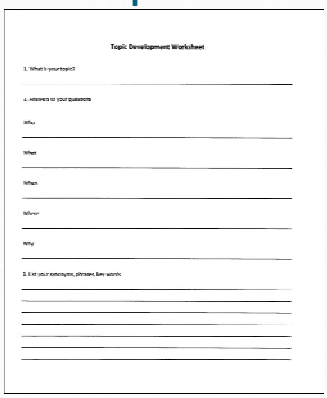
## Topic Development Worksheet



Topic Development Worksheet

1. What is your topic?

2. Answers to your questions

Who:

What

When

Where

Why

3. List your synonyms, phrases, &w words

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## Topic Development Worksheet

4. Arrange your key words, etc. by concept

| Concept 1 | Concept 2 | Concept 3 | Concept 4 | Concept 5 |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

5. List limits - language, dates, etc.

6. List possible sources for information

7. Work area for search strategies

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## Example

M.J. asks for information on power.
You ask for clarification. It is energy. Electricity not gas.

| Broader term | Power | | | |
|---|---|---|---|---|
| Narrower term | Energy (narrower or synonym?) | | | |
| Narrower term | electric/electricity | | | |
| Narrower term | Narrower term | Narrower term | Narrower term | Narrower term |
| | water | wind | coal | solar |
| | hydroelectric | | | photovoltaic |

Examples of a few questions that you may want to ask:

- Use or purpose of information
- Statistics, production
- Companies that produce or are involved with
- Locations – U.S. or elsewhere, GIS
- Patents

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## Hands-on Exercise

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## Constructing your Search

- Connection words (AND, OR, NOT) – Boolean Logic
- Phrases
- Spelling variations (alternate spellings, foreign spellings)
- Wildcard, stemming, truncation symbols – symbols that take the place of one to many letters or other words in order to provide multiple forms of the root word
- Proximity operators and search features

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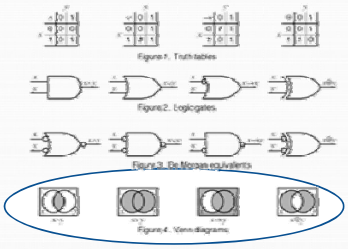
## Boolean Logic



Boolean Logic is used to narrow or broaden your search.

*Various representations of Boolean operations* (source Wikipedia)



## Boolean Logic - Using AND

**AND** is used to narrow your search. The results will have all of the words that you "anded" together. Stemming may occur.

It is commonly represented by the word, **and**; or the plus sign, **+**; or by a space.

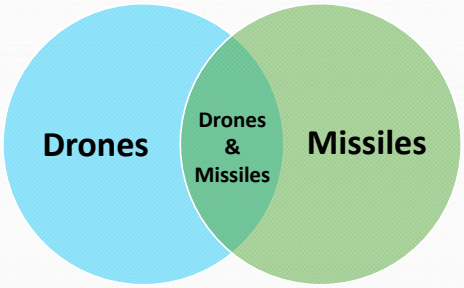
***You enter:***
addiction AND treatment

***What happens?***
The results include both words: addiction and treatment, in any order or proximity; stemming may occur



## Venn Diagram illustrates Boolean Logic

**drones "anded" with missiles**



## Boolean Logic - Using OR

**OR** is used to broaden a search. The results will include either one of the words that you typed, or both words. Stemming may occur.

OR is a good tool to use when there are several spellings and/or synonyms of a word.

| *You enter:* | *What happens?* |
| --- | --- |
| cocaine OR crack | The results may include cocaine, or crack, or cocaine and crack. The number of possibilities increase with stemming. |

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## Boolean Logic - Using NOT

**NOT** is used to narrow a search by excluding search term(s). The results will contain the terms before NOT, but not the term(s) that you excluded.

| *You enter:* | *What happens?* |
| --- | --- |
| drugs NOT prescription | The results will include drugs but will not include prescription. |

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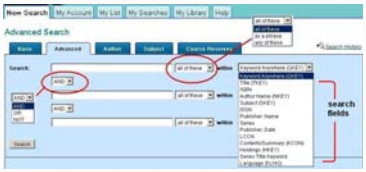
## Boolean Logic

*Keep in mind, different Search Engines offer different degrees of Boolean support and no single search engine covers everything.*




Demonstration of Boolean Logic.

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## Boolean Logic Operators - Examples

| Search | Results |
|---|---|
| laden AND taliban | finds documents containing both words |
| usama OR osama | finds documents containing either word or both words |
| organization or organisation | finds documents containing either word or both words |
| tank NOT armor | finds documents containing the first word but not the second |
| omar AND (taliban OR afghanistan) | finds documents containing the first term in combination with the second or third term |

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## Phrases - Examples

Put the words between **"quotation marks"** to search for a phrase. This tells the search engine to only bring back those pages that include these search terms exactly as you typed them, in order, proximity, etc.

| Search | Results |
|---|---|
| "osama bin laden" | finds documents that contain this phrase as written, in this order, without stemming |
| "lord of the flies" | an example of stop words in the phrase, which in this case, is the title of a book |
| "search and rescue" | finds documents that contain this phrase as written, instead of "anding" the terms which would allow stemming |

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## Spelling Variations - Examples

- Some search engines will offer alternative spellings, that may include diacritics, as you type your terms in the search box. You may want to explore these options.
- Known spelling variations, may be "**ored**" together.
- Spelling variations are easily addressed if truncation symbols/wildcards are available.

| Search | Results |
|---|---|
| aluminum or aluminium | finds documents that contain either word or both words; stemming may occur |
| osama or usama | finds documents that contain either word or both words; stemming may occur |

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## Truncation/Wildcards

Each search engine is different, and truncation/wildcards may or may not be an option, or they may be limited.

There may be a truncation symbol for only one letter, or for variant endings or beginnings. Truncation should not be confused with variant search results.

The symbols that are most often used are the asterisk, *; question mark, ?; and the exclamation point, !

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## Truncation/Wildcards - Examples

| Search | Results |
|---|---|
| *sama | finds documents that contain sama as the ending of a word or phrase; the * may represent one letter or more |
| | |
| alumin* | finds documents that contain alumin as the root word; British and American spellings of the metal will be included in the results |
| organi*ation | finds documents that contain organization or organisation |

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## Proximity Operators

Each search engine is different, and proximity operators may or may not be an option. Proximity operators allow you to search for words or phrases that are close to one another.

**AROUND(#)**, or **w/#**, or **near/#** are often used to specify that the first word is within a specific number, #, of words of the second word.

The **before/#** operator specifies that the first word is within # words and before the second word.

The **adj** operator specifies that one word is adjacent to another word in the order that it is written.

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## Proximity Operators - Examples

| Search | Results |
|---|---|
| "state department" w/5 report | finds documents that contain the phrase, "state department," within 5 words of the word, report, but not necessarily in that order. A few possible results are:<br>• The State Department report<br>• The State Department issued a report<br>• The report was promulgated by the State Department |
| robert w/3 jones | finds documents that contain robert within 3 words of jones, but not necessarily in that order. A few possible results are:<br>• Robert Michael Jones, Jr.<br>• Robert M. Jones<br>• Jones, Robert<br>• Jones, Jr, Robert |
| senator before/10 clinton | finds documents that contain the word, senator, within 10 words and before the word, clinton |
| congressional adj hearing | finds documents that contain the word, congressional, directly followed by the word, hearing |

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## Case Sensitivity

- Varies with search engine
- Generally, search in all lower case (some search engines distinguish between proper nouns, i.e. people's names by capitalizing the first letter)
- The capitalization of Boolean operators varies with each search engine

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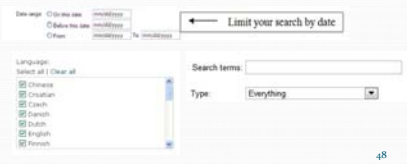
## Limit your Search

You may be able to limit by:

- Date (Note: the date may be the date that the information was created, posted, or updated)
- Language
- Media type
- Site

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## Search Features

- Use tool-specific features to limit
- Best to use when a search has returned large number of web pages
- Types of search field – Anchor, Domain, Like, Link, Text, and URL
  - Site – limit to specific site or domain (i.e. army.cz; army.ru)
  - Like – Web pages similar to a result page
  - Link – Pages linked to a specific URL
  - Text – Specific text in body of web page
  - URL – Specific text in the URL
  - File Type – Search for PDF or non-HTML documents

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## Examples of Search Features

| Google | Yahoo |
|---|---|
| site: | site: |
| link: | intitle: |
| filetype: | url: |
| inurl: | |
| numrange: | |

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## Initial Search Method

Decide on your initial search method.

Typically:

Keyword Search
Most common in search engines
**Most common search**

Subject search
Possible where available (databases, library, directories)
Typically not available in standard Internet search engines

***Utilize the advanced search option.***

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## The Search

### The results of your search

The results that are retrieved may be arranged by date or by relevance. In some systems, you may not be able to sort your results; or you may have several choices.

### Refine your search

Based on initial results:

- Narrow search by using AND or more specific terms
- Broaden search by removing some terms or using OR in the search string to include more terms or search features
- Choose another search engine, directory, or database

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## Advanced Search

Google advanced search
http://www.google.ca/advanced_search

Yahoo! advanced search
http://search.yahoo.com/web/advanced

Bing advanced search

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## Practice Exercises

Create a query for the following scenarios:

1. Medical NGOs in Thailand

2. Capabilities of SA-7 missile

3. How many LNG terminals are there on the west coast?

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## Exercises Solutions

A few solutions:

1. Thailand AND (ngo OR ngos OR "non-governmental organizations" OR aid) AND (medical OR health OR disease) NOTE: ngo synonym list can be expanded

2. (sa-7 OR sa7 OR grail) AND (missile OR SAM OR surface-to-air missile)

3. (lng OR "liquefied natural gas") AND (terminal OR port) AND (alaska OR washington OR Oregon OR california OR "west coast")

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# Lesson 4

## Citing Your Sources

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## Citing Your Sources

The Air Force Institute of Technology Library refers their students to the following page:
http://www.afit.edu/library/subjectpage.cfm?page=63

Highlights of the AFIT Study Guide:
(http://www.afit.edu/en/docs/StyleGuide.pdf):

- Sources listed below should be consulted for information pertaining to other documentation and bibliographic systems (please use latest editions)
- Most professional journals contain style guidelines which potential authors are required to follow when preparing articles for publication
- Many publications include their "Style Guide for Authors" in the first number of each volume, or on the back cover of each issue
- Consult your research advisor to determine which publication style is most appropriate for your discipline

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## Citing Your Sources

Visit the AFIT Library (www.afit.edu/library/) to see the variety of resources and guides currently available. Contact a librarian for specific help.

- American Chemical Society. American Chemical Society Style Guide and Handbook. Washington.
- American Institute of Physics. Publications Board. Style Manual for Guidance in the Preparation of Papers. New York.
- American Psychological Association. Publication Manual of the American Psychological Association. Washington.
- American National Standards Institute. Scientific and Technical Reports – Preparation, Presentation, and Preservation. ANSI/NISO Z39.18. Bethesda MD: NISO Press.
- Associated Press. The Associated Press Stylebook. Dayton OH: Lorenz Press.
- The Chicago Manual of Style. Chicago: University of Chicago Press.

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## AFIT Library

- Council of Biology Editors. Style Manual Committee. CBE Style Manual: A Guide for Authors, Editors, and Publishers in the Biological Sciences. Bethesda MD.
- Gelfand, Harold and Charles J. Walker. Mastering APA Style: Student's Workbook and Training Guide. Washington: American Psychological Association.
- Harvard Law Review: A Uniform System of Citation. Cambridge MA.
- Hodges, John C., and others. Harbrace College Handbook. New York: Harcourt Brace Jovanovich.
- Modern Language Association. MLA Style Manual and Guide to Scholarly Publications. New York.
- Turabian, Kate L. A Manual for Writers of Term Papers, Theses, and Dissertations. Chicago: University of Chicago Press.
- United States. Government Printing Office. GPO Style Manual. Washington.

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## Citing Your Sources

The Air University Muir S. Fairchild Research Information Center refers their students to the following sites:

UNC Health Science Library EndNote X5:
http://www.hsl.unc.edu/Services/Tutorials/ENDNOTE/intro.htm
and the Purdue Online Writing Lab (OWL):
http://owl.english.purdue.edu/

The Naval Postgraduate School Library refers their students to the University of Berkeley Library guide on Citing Your Sources:
http://www.lib.berkeley.edu/instruct/guides/citations.html

The U.S. Army War College Library web page on Endnote Examples:
http://www.carlisle.army.mil/library/endnote_examples.htm

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## Citing Your Sources

The U.S. Army War College Library web page on Bibliography Examples:
http://www.carlisle.army.mil/library/bibliography_examples.htm

The U.S. Naval Academy Nimitz Library web page on Citing Your Sources:
http://libguides.usna.edu/content.php?pid=117931&sid=1017203

The DNI Intelligence Community Directive number 206:
http://www.dni.gov/electronic_reading_room/ICD_206.pdf

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# Lesson 5

## Searching, and Evaluating Your Search Results

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## Searching, and Evaluating Your Search Results

A word about searching, and evaluating your search results.

- Be objective
- Alternative perspectives and contrary reporting should be provided
- All available sources of information should be accessed
- Document your search journey

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## Wikipedia and Similar Sources

- They are user maintained
- Avoid using as a primary source
- May be good for background information
- Investigate the listed references

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## Summary

- Plan your initial search.
- Compile a list of concepts and search terms.
- Who might have the information? You may need to use their query tools to get into their database.
- Learn how to use the resources - search engines, directories, etc.
- Bookmark the most significant resources and save the most productive search strategies.
- Learn from your searches. Vary your approach as you learn.
- Remember… all of the search tools, combined, will not retrieve everything.
- Remember… there isn't just one search tool.

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